REMARKS

Claims 1-5, 7-11 and 13-17 are pending in the application.

Claims 1-2, 4, 7-11 and 13-17 are amended above to more clearly set forth what it is that the Applicants regard as their invention.

Claims 6, 12 and 18 are cancelled from the application above without prejudice.

No new matter is added to the claims by these amendments.

I. THE SECTION 112, 2nd PARAGRAPH REJECTION

The Examiner rejected claims 4, 10 and 16 under 35 U.S.C. 112, second paragraph, as allegedly being indefinite. The Applicants assume that the Examiner intended to include claims 1, 7 and 13 in this ground of rejection and all claims dependent therefrom, having regard to the objection to these claims in the immediately following paragraph on page 3 of the Office Action. Applicant's response is based upon this assumption.

Claims 1, 7 and 13, at step d), sub-step iii), and all claims dependent therefrom are rejected because of the wording "to provide parameters *RATIO*." In relation to claim 1, step d), sub-step iii) this term means that the method treats a first object containing a second object as a tubule, the second object being the tubule's hole. Expressing the second object's area as a proportion of a first object's area results in the hole's area being expressed as a proportion of the tubule's area; i.e. there may be more than one value of *RATIO*, because there is a respective value of *RATIO* for each first object containing a second object, and there may be more than one such first object. See Applicants' specification at page 13 lines 16-19, where $RATIO = \frac{hole\ area}{object\ total\ area}$, i.e. for each object in the image, *RATIO* is the ratio of the area of that object's hole(s) to its total area including its hole(s). *RATIO* is large for objects (tubules) with relatively large holes and small for objects with relatively small holes compared to object size. Ultimately, the applicants have overcome the examiner's rejection by amending the wording of claims 1, 7 and 13 to clarify the objected-to language.

The Examiner rejected claim 4, 10, and 16 for use of the wording "multiplying pixels in the second image (60) by or ANDing them". An AND gate with two inputs each of one bit acts as a multiplier. In this connection please see Applicants' specification at page 11 line 16 to page

12 line 2. As is well known to those skilled in the art of binary logic (or Boolean algebra) on which all digital computers are based, AND is one of three basic logical operations AND, OR and NOT. Other operations are derived from these, e.g. NAND (not AND), EXOR (or XOR, exclusive OR). Boolean algebra has variables which have two values TRUE and FALSE, expressed by binary digits 1 and 0 respectively.

An AND gate has two or more inputs, it provides an output which is 1 (TRUE) if and only if all its input bits are 1; i.e. the output is 0 (FALSE) if any one or more of its inputs are 0. For a two-input AND gate with binary inputs X and Y (i.e. one bit, 0 or 1 only), this is expressed by the table below:

Input Bit X	Input Bit Y	Output Bit
0	0	0
1	0	0
0	1	0
1	1	1

By inspection of the table above, a two-input AND gate acts as a multiplier because its output is equal to the product of its two input bits X and Y, *i.e.*, the product of X and Y is 1 only if both X and Y are 1, and the product of X and Y is 0 if X or Y or both are 0. AND gates are used as multipliers in some digital circuits. (*See e.g.* US Pat. No. 4,885,715 in which an array of one-bit full adders each with an AND gate at one input produces cascaded multiply-add operations). The AND gate multiplies two input bits to produce a product bit. The full adder adds the product bit to a third input bit to produce sum and carry output bits, which propagate down array columns and along array rows respectively for accumulation in cascade.

Applicants' specification at page 11 line 16 to page 12 line 2 discloses images 60 and 70 each of which is binary, *i.e.*, their pixels have one bit values 0 or 1 only. Page 11 lines 22-23 discloses a logical AND operation carried out between each pixel in the image 60 with the respective corresponding pixel in the same position in the other image 70. Because a one bit AND operation is a multiplication, this process multiplies each pixel in one image by a like-located pixel in the other. The wording of claims 4, 10 and 16 therefore expresses the two alternatives of multiplying two pixel values together by conventional arithmetic, or making use

of the fact that each pixel value is one bit and ANDing the pixel values with one another to obtain the same resulting product. Here the expression "ANDing" is fairly common shorthand for using an AND gate to multiply two input bits to produce a product bit. The examiner's rejection of claims 4, 10 and 16 are overcome by amending the claims above to clarify this aspect of the claimed invention.

Claims 2, 8, and 14 have been amended to provide the clarification required by the Examiner.

II. THE SECTION 101 REJECTION

Claims 1-5, 7-11, and 13-17 stand rejected under 35 USC § 101 as being directed to non-statutory subject matter. Independent claim 1 is amended above to include the limitation of "using the grading of the first image's tubules to provide a tubule score for use in diagnosis". This makes it clear that a tubule score is a physical measurement which is useful in diagnosis, and the making of useful measurements is well accepted to be a "useful process" with "practical utility" for the purposes of 35 USC § 101. As the Examiner points out, a useful result may expressed in numbers, such as price, profit, percentage, cost, or loss, and also (it is submitted) a tubule score. The amendment to claims 1, 7 and 13 are based *inter alia* on Applicants' specification at page 7 lines 10-11, which states "this provides a tubule score 18 for input to a diagnostic report". Similar amendments have been made to independent claims 7 and 13. Claims 2-5, 8-11, and 14-17 depend from claims 1, 7 and 13 respectively, so these amendments apply to all dependent claims also.

The Examiner states that claims 7-11 are drawn to apparatus without physical limitations. Claim 7 is amended above to include limitations to a microscope, a camera and digitised colour image data in addition to computer means. Those amendments are based in part on Applicants' specification at page 6 line 28 to page 7 line 11 and page 16 lines 13-19. Claim 7 has dependent claims 8-11, to which this amendment applies also.

The Examiner also rejected claims 13-17 because they are drawn to a computer program *per se* – and not to a program disposed on a computer readable medium. Independent claim 13 is amended above to begin "A computer program software product comprising a carrier medium encoded with computer readable instructions. This amendment is based on Applicants'

specification at page 16 lines 13-15. Claims 14-17 depend from claim 13, so the amendment applies to those dependent claims also.

CONCLUSION

The pending application claims are believed to be ready for patenting for the reasons recited above. Favorable reconsideration and allowance of all pending application claims is courteously solicited.

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